MAY 20 1982

TRIM® SOL

DATA AND INFORMATION

July, 1978

DMS 1829

GENERAL DESCRIPTION:

TRIM® SOL is a CHEMICAL EMULSION CONCENTRATE containing a STABLE CHLORINE additive which acts as a FRICTION REDUCING LUBRICANT. This product is designed for a wide variety of metal removal operations on most FERROUS METALS and many non-ferrous metals such as BRASS, COPPER and ALUMINUM.

ADVANTAGES:

- WIDE RANGE JOB APPLICATION from tough assignments such as gear hobbing and broaching to lighter duties like turning, TRIM® SOL has proven EQUALLY EFFECTIVE.
- EASILY ADAPTABLE to NON-FERROUS and FERROUS METALS including tough STAINLESS STEEL ALLOYS; even delivers good finish on soft materials such as ALUMINUM ALLOYS.
- STABILITY. TRIM® SOL forms an extremely tight emulsion of fine particle size. This tight, stable emulsion allows TRIM® SOL to be run for extended periods without pump-outs.
- HOUSEKEEPING IS EASY with TRIM® SOL'S built-in CLEANING ACTION—metal chips and dirt will not build-up, therefore machines stay CLEAN.
- FLUID RESIDUE prohibits sticky ways and slides—a most important consideration in the operation of AUTOMATIC and NUMERICALLY CONTROLLED MACHINES.

Available in 5 gallon and 54 gallon Drums and Tank Wagon Lots.

PHYSICAL PROPERTIES: (TYPICAL DATA)

Form..... Fluid
Color..... Dark Green
Specific Gravity..... .99
Odor..... Mild
Pour Point..... −20°F (−28.9°C)
Flash Point..... (Cleveland Open Cup) 305°F (151.7°C)
Fire Point..... (Cleveland Open Cup) 370°F (187.8°C)
Viscosity..... 301 SSU@100°F (37.8°C)
Residue..... Liquid
pH..... 9.2 at 2% conc. 9.4 at 5% conc.

see back cover for recommended usage:

Dear Customer

You are about to use the finest metalworking fluid concentrate available today. However, as is the case with practically all metalworking fluids, there are a few potential risks involved with its use. Fortunately, by observing the following simple, common sense precautions these risks can be reduced to a bare minimum.

Obviously this product is not designed to be consumed internally and it may be harmful if swallowed. Should this product be accidentally ingested, do not induce vomiting. Instead have the stomach pumped. Be sure to contact the plant safety director or a physician.

This product possesses many properties similar to those of a soap or detergent. Because of this it may cause eye irritation or damage if splashed into the eyes. Use of safety glasses or goggles is suggested. Should eye contact occur, flush with clean water for 15 minutes and contact the safety director or a physician.

Along these same lines, this product may cause minor skin irritation ("dishpan hands") upon repeated or prolonged contact. If this should happen, the safety director or physician should be consulted for appropriate skin protection.

This product is not designed for use with magnesium, cadmium, lead or alloys containing substantial concentrations of these metals. Should it be used with these metals, there is a chance of product deterioration, adverse health effects and corrosion of work materials and machine parts and fixtures.

This product should not be mixed with other metalworking fluids or metalworking fluid additives as this may produce adverse health effects as well as diminish the effectiveness of its intended purpose. If inadvertent contamination should occur, please contact Master Chemical Corporation for recommended action.

This product is mentioned in a NIOSH report that was published in August of 1976.* The report stated that during the course of the study reliable tests had been run and it was determined that this product "... is non-toxic and is not a hazard due to inhalation."

Because this product is a lubricant it is only logical to expect that spills and areas of residue deposits will cause slippery conditions. Spills and/or residue deposits should be cleaned up immediately. Cleaning materials appropriate for the situation should be used. Also, care should be taken to avoid contaminating this product with the cleanup materials.

Toxicity Data (10% solution in deionized water)

TRIM® SOL has undergone tests for determination of inhalation toxicity, acute oral toxicity, eye irritation and skin irritation. A brief synopsis of each test follows.

The inhalation toxicity study, carried out with Wistar-Sherman strain albino rats, showed TRIM® SOL to be non-toxic for inhalation. This conclusion has been supported by a recent NIOSH study (Report #76-23-319) in which they state TRIM® SOL is non-toxic and is not a hazard due to inhalation.

The acute oral toxicity study was also carried out with Wistar-Sherman strain albino rats. This study showed TRIM® SOL to have an acute oral LD_{50} greater than 5.0 g/kg, thus classifying it as a non-toxic substance.

The eye irritation study utilized New Zealand albino rabbits. Although there was no perceptible irritation when the eyes were washed after a 4 second exposure, the test results did indicate that TRIM® SOL is a slight eye irritant.

The dermal study was run in the form of a repeated insult patch test using human volunteers. The test results demonstrated TRIM® SOL not to be a primary irritant or a sensitizing agent. However, in a small percentage of the subjects TRIM® SOL exhibited properties characteristic of a fatiguing agent.

Complete test results are available upon request from the Health & Safety Department of Master Chemical Corporation.

*Title: Health Hazard Evaluation/Toxicity Determination Western Gear Corporation, Jamestown, North Dakota
Report#: NIOSH-TR-HHE-76-23-319

Coolant Disposal

General Remarks and Warnings

Used coolants should not be introduced directly into sanitary or storm sewers because of oil contamination effects. Since all used coolants contain petroleum oils, either by virtue of their composition or because of tramp oil contamination, they must not be emptied into sanitary or storm sewers without treatment. Petroleum oils are not easily degraded and strict limitations apply to the amount of oil permissible in industrial effluents. Hydraulic, lubricating or other oils in the spent coolant will interfere with sewage treatment and may contaminate streams and lakes. Before proceeding, check with your local Public Health Service, sewage treatment plant or state authorities regarding trade waste disposal standards in your area.

In general, an acid-alum "split" is suggested as the disposal procedure for spent TRIM® coolants. When handling the chemicals used in this procedure, keep in mind that they are strong acids and alkalies and as such should be treated with the proper respect. Alum, sulfuric acid and sodium hydroxide (caustic soda) are extremely irritating and damaging to the skin and mucous membranes (eyes, nose and throat). Protective equipment that should be worn includes chemical goggles, rubber gloves, rubber apron, rubber boots, hat and maximum coverage type clothing. In case of contact, flush the area with large amounts of cool clean water for 15 minutes. Contact a physician as soon as possible. Also, be sure to clean up spills of these materials as soon as possible to avoid slippery conditions.

Acid-Alum Split—Suggested Procedure

IMPORTANT: The trade waste treatment process described below is for spent solutions of TRIM® SOL. However, EVERY BATCH OF WASTE IS DIFFERENT and consequently it is impossible to predict exactly how much of each chemical will be required for treatment of a particular batch of waste. THE PRESENCE OF OTHER TRADE WASTES IN THE SPENT TRIM® SOL WILL UNDOUBTEDLY REQUIRE MODIFICATION OF THIS PROCEDURE. For this reason we suggest that a professional trade waste treatment consultant be contacted for recommendations as to equipment and specific processes in view of the total trade waste out-put of your plant.

For 1000 gallons of spent TRIM® SOL, we suggest the following treatment:

1) Separation of unemulsified tramp oil:
   a) Allow the trade waste to stand undisturbed for 24 hours. At the end of this period centrifuge, skim or by some other means remove the tramp oil which floats to the top of the tank.
   b) This oil can be hauled away, burned or re-refined.
2) Separation of organic materials and emulsified tramp oil from the coolant solution:
   a) Add enough concentrated sulfuric acid to the trade waste to lower the pH to 3.5. Two to three gallons of concentrated sulfuric acid will be required per 1000 gallons of spent coolant. Mix the solution continually while these additions are being made.
   b) Add 1.5 gallons of 17% alum (aluminum sulfate) solution to the acidified trade waste while mixing. See (8) for subsequent treatment.
3) Allow the mixture to stand undisturbed until a good separation of the insoluble materials is achieved (usually 24 to 48 hours).
4) Remove any solid materials and residual oil which floats to the top of the tank.
5) While mixing at low speed, add 50% caustic soda to the solution until a pH between 6.5 and 7.0 is reached. Two to three gallons of 50% caustic soda (sodium hydroxide) will be required.
6) Allow the aqueous mixture to stand undisturbed for 24 hours to permit the aluminum hydroxide floc to settle to the bottom of the tank. This will remove any residual organic matter remaining from the previous treatment.
7) The clear water layer should now be suitable for disposal as plant effluent. At this point, the water layer must be separated from the aluminum hydroxide slurry which has settled to the bottom of the tank. The water can be drawn off by valves located at various levels on the tank. Alternatively, the aluminum hydroxide floc can be floated by bubbling air from the bottom of this tank. As the floc reaches the top of the tank, it may be skimmed off and disposed with other solid waste. Alternatively, the aluminum hydroxide floc may be removed to a clean container and treated as described in (8) and (9).
8) Acidify the aluminum hydroxide slurry with concentrated sulfuric acid to regenerate aluminum sulfate.
9) Recycle the aluminum sulfate solution resulting from step 8 to the next batch of trade waste. Ten percent makeup of fresh alum is suggested to replace loss of this chemical.

COMMENTS:

1) Alum flocculation is superior to that of calcium chloride. The trivalent ion is, in general, far more effective in this function than divalent ions. In turn, the aluminum trivalent ion is more effective than other common trivalent ions.
2) Maintenance to reduce oil leakage in machine tools is strongly recommended. The savings in oil resulting from an effective program could equal or exceed the cost for the trade waste program. Elimination of oil contamination will prolong coolant life.
3) A review of coolant practices is suggested for prolonged coolant life. Prevention of contamination, concentration control and improved water quality are simple and effective ways to reduce costs and minimize trade waste disposal.

Metal-Operation-Fluid (MOF) Table

MACHINING OPERATION	TOOL MATERIAL	PLAIN CARBON STEELS	ALLOY STEELS	CAST STEELS	ARMOR PLATE	NITRIDING STEELS	FREE MACHINING STAINLESS STEELS	MARTENSITIC STAINLESS STEELS	PRECIPITATION HARDENING STAINLESS STEELS	NICKEL BASE HIGH TEMP. ALLOYS SOLUTION TREATED	GRAY CAST IRONS *	DUCTILE CAST IRONS *	MALLEABLE CAST IRONS *	ALUMINUM ALLOYS	COPPER ALLOYS	TITANIUM ALLOYS
TURNING	HSS															
	CARBIDE															
FORM TURNING	HSS															
	CARBIDE															
BORING	HSS															
	CARBIDE															
COUNTERBORING	HSS															
	CARBIDE															
SPOT FACING	HSS															
	CARBIDE															
PLANING	HSS															
	CARBIDE															
BROACHING	HSS															
	CARBIDE															
FACE MILLING	HSS															
	CARBIDE															
SLAB MILLING	HSS															
	CARBIDE															
METAL SLITTING	HSS															
	CARBIDE															
END MILLING	HSS															
	CARBIDE															
DRILLING	HSS															
	CARBIDE															
GUN DRILLING *	HSS															
	CARBIDE															
TREPANNING	HSS															
	CARBIDE															
TAPPING	HSS															
REAMING	HSS															
	CARBIDE															
POWER SAWING	HSS															
CIRCULAR SAWING	HSS															
	CARBIDE															
THREAD MILLING *	HSS															
GEAR HOBBING	HSS															
GEAR CUTTING	HSS															
GEAR SHAPING	HSS															
GEAR SHAVING	HSS															
GEAR GRINDING *	—															
SURFACE GRINDING	—															
CYLINDRICAL GRINDING	—															
INTERNAL GRINDING	—															
CENTERLESS GRINDING	—															
THREAD GRINDING *	—															
ABRASIVE CUTOFF *	—															
HONING *	—															

Starting Solution 5%-(19:1) Make-Up Solution 3%-(32:1)

Starting Solution 10%-(9:1) Make-Up Solution 7%-(13:1)

Starting Solution 20%-(4.1) to 5%-(19:1)

Starting Solution 2%-(49:1) Make-Up Solution 1.5%-(65:1)

Starting Solution 3%-(32:1) Make-Up Solution 2%-(49:1)

*For special recommendations, contact MCC

NOTE: The indicated operations are those usually recommended for TRIM® SOL such as drawing, stamping, punching, trimming, etc. For **specific recommendations,** see your TRIM® Service Engineer or write Master Chemical Corporation direct.